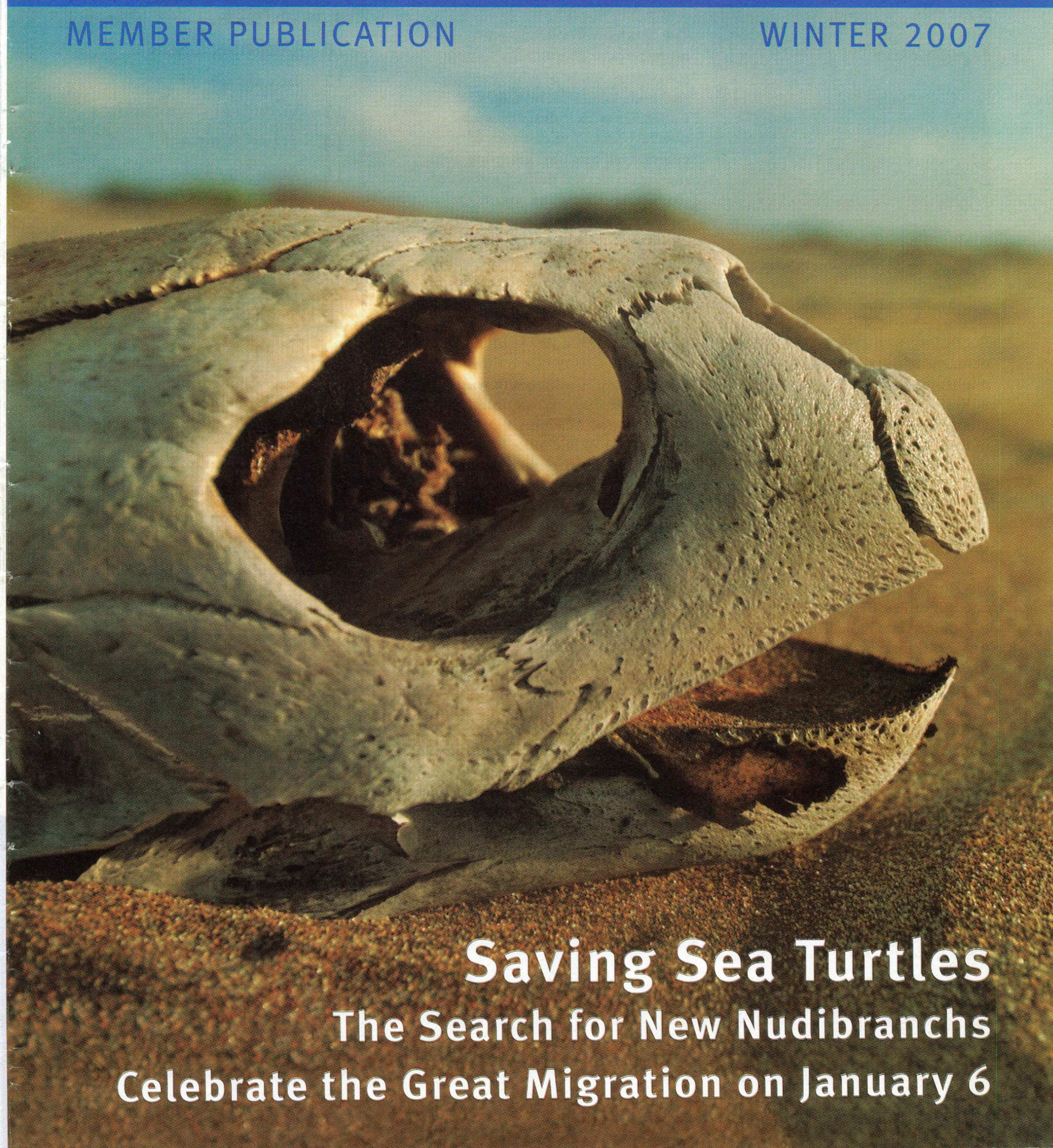


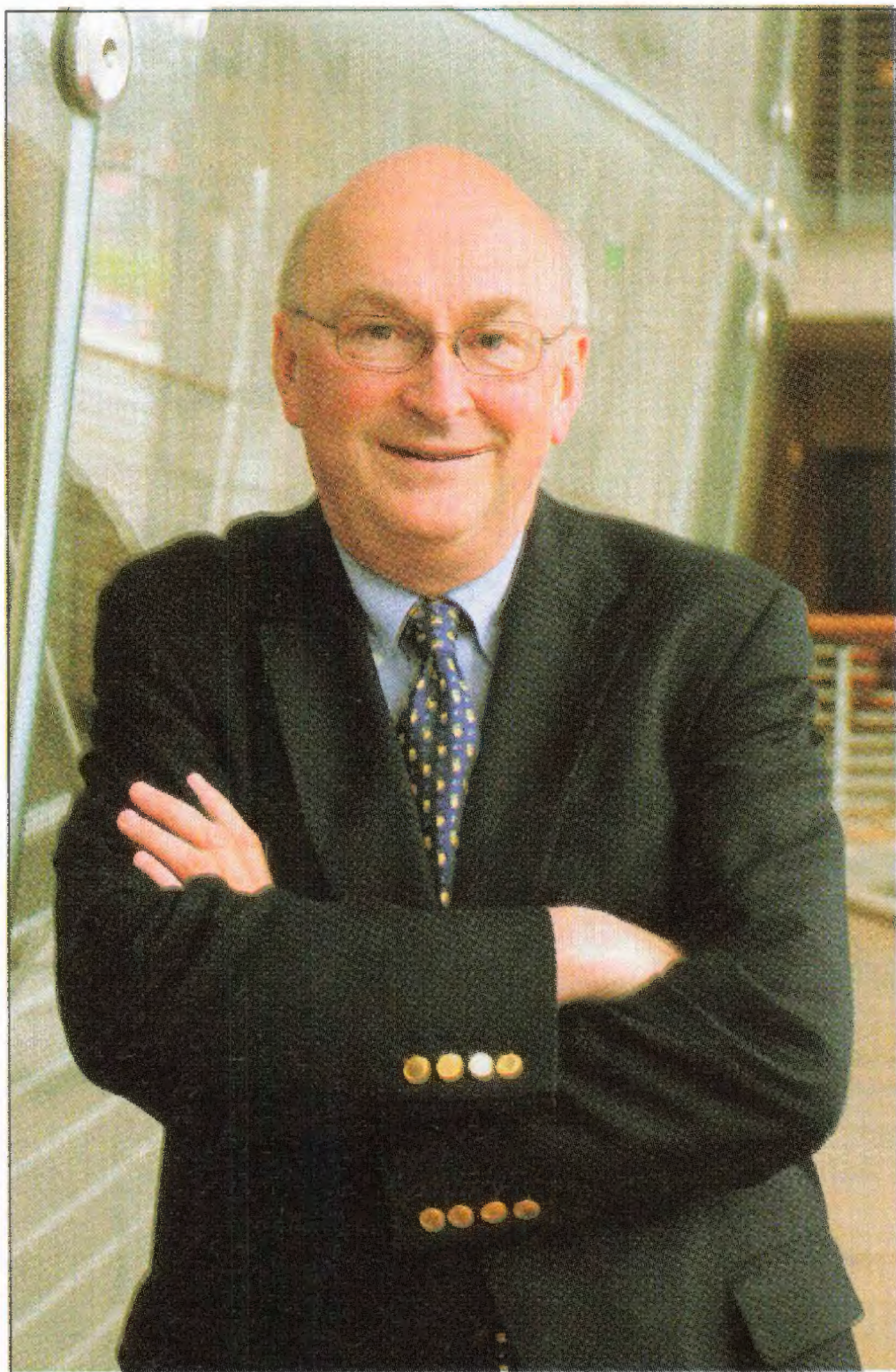
CALIFORNIA ACADEMY OF SCIENCES

MEMBER PUBLICATION

WINTER 2007



Saving Sea Turtles
The Search for New Nudibranchs
Celebrate the Great Migration on January 6



Most libraries are filled with books. The Academy is home to libraries of a different sort. Though it does have a fine collection of books, it excels in its libraries of life, known as the specimen collections.

The Academy's collections are home to over 20 million scientific specimens, many of which are strikingly beautiful. Brilliant blue butterflies with iridescent wings, quetzals with long cascades of emerald tail feathers, glittering gold nuggets collected in the foothills of the Sierras—these are among the most eye-catching treasures in the Academy's cabinets. Tube worms and crab shells might not normally command the same attention, let alone pickled cuttlefish.

But beauty, as they say, is in the eye of the beholder. Once you see these denizens of the deep through the eyes of local artist Tiffany Bozic, they just might surprise you. One of the first participants in the Academy's new Artists in Residence program, Bozic has spent the past year studying sea urchins, crabs, tube worms, and other deep-sea creatures in the Academy's Department of Invertebrate Zoology alongside Curator Rich Mooi. While Mooi has studied the animals' anatomies and DNA, Bozic has focused on their graceful lines and rhythmic shapes. The results of her residency are now on display in the new exhibit, *From the Depths: Inspiring Science and Art*. The exhibit, which includes Bozic's paintings as well as specimens and live animals, will be open through January 6, 2008.

On January 7, the Academy will begin moving all its tube worms, cuttlefish, and butterflies, along with the rest of its 20 million scientific specimens, back to Golden Gate Park. The penguins and fish of Steinhart Aquarium—all a bit friskier in anticipation of their roomy new tanks—will quickly follow. In order to ensure that this Great Migration goes as smoothly as possible, we will be closing our Howard Street museum at the end of the day on January 6.

Before we close, however, we're throwing one last party at Howard Street—a Bon Voyage party for our animals and research specimens. Throughout the day on Sunday, January 6, we'll offer a series of talks about what it takes to move everything—from a 75-foot-long blue whale skeleton to a 70-year-old Australian lungfish—and we'll share our plans for the new exhibits under construction in Golden Gate Park. An arts and crafts station will allow kids to decorate moving labels for our specimen boxes and make murals for the animal transport trucks. We'll also officially kick off our countdown to opening day in Golden Gate Park. We hope you'll be able to celebrate with us—both here at Howard Street on January 6th and during our special member preview days next year at the new Academy. The penguins will be waiting to greet you, and so will I!

- Greg Farrington, Executive Director

MEMBER PUBLICATION

Winter 2007, Issue No. 7

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Conservation Photographer Neil Osborne blends his backgrounds in biology and visual communication with the intent to document stories about conservation efforts that preserve animal diversity and environmental habitats.

Visit www.visionsbyneilosborne.com

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Notes *from the* Field



Diving for sea slugs off the coast of Malaysia

With their brilliant hues and ornate tentacles, nudibranchs—or sea slugs, as they're commonly called—are among the world's most visually striking animals. They occupy a wide range of aquatic habitats, from polar waters to tropical seas, shallow reefs to deep-sea trenches. A few are even found in tropical freshwater rivers. Over 3,000 species have been discovered and described to date, and scientists estimate that another 3,000 species are yet to be named.



This fall, a team of divers and scientists—including Dr. Terry Gosliner, Senior Curator of Invertebrate Zoology & Geology at the Academy, and David Behrens, Academy Research Associate—traveled to Malaysia in search of nudibranchs. By combing the reefs off the eastern coast, they hoped to document the diversity of this poorly-studied region and add to an ambitious ongoing project: a comprehensive field guide to Indo-Pacific nudibranchs. Dr. Gosliner shares his memories of the expedition in the journal entries that follow.



A favorinid

October 2, 2007

Pulau Tioman

At Pulau Tioman, we take a break from the ocean and hike through the rainforest, ending at a lovely waterfall where we refresh ourselves in a rocky pool. Later, while diving offshore, I encounter a pleasant surprise: a nudibranch I've wanted to find for almost two years. It's a new species of *Dermatobranchus*, beautifully outlined in orange and periwinkle spots. It will make a wonderful addition to a paper I've been working on to revise the genus. Surprises like these are what make research in the field so rewarding.

*Dermatobranchus* sp.

September 29, 2007

South China Sea

Although jet-lagged from my 26 hours of travel, I am excited to be speeding across the South China Sea on *The Ocean Rover*, the ship that will be my home for the next 11 days. Our first stop will be Pulau Tenggol. (Pulau means "island" in Malay.) The dozen people on our team represent a diverse mix of occupations and nationalities: psychiatrist, businessman, museum curator, nurse, medical technician, and more, hailing from the United States, Korea, and Greece. Though we have very different backgrounds, three things unite us: our enthusiasm for diving, photography, and nudibranchs.

After a hearty dinner of curried beef on rice, we turn in early so that we're well-rested for a full day of fieldwork tomorrow.

September 30, 2007

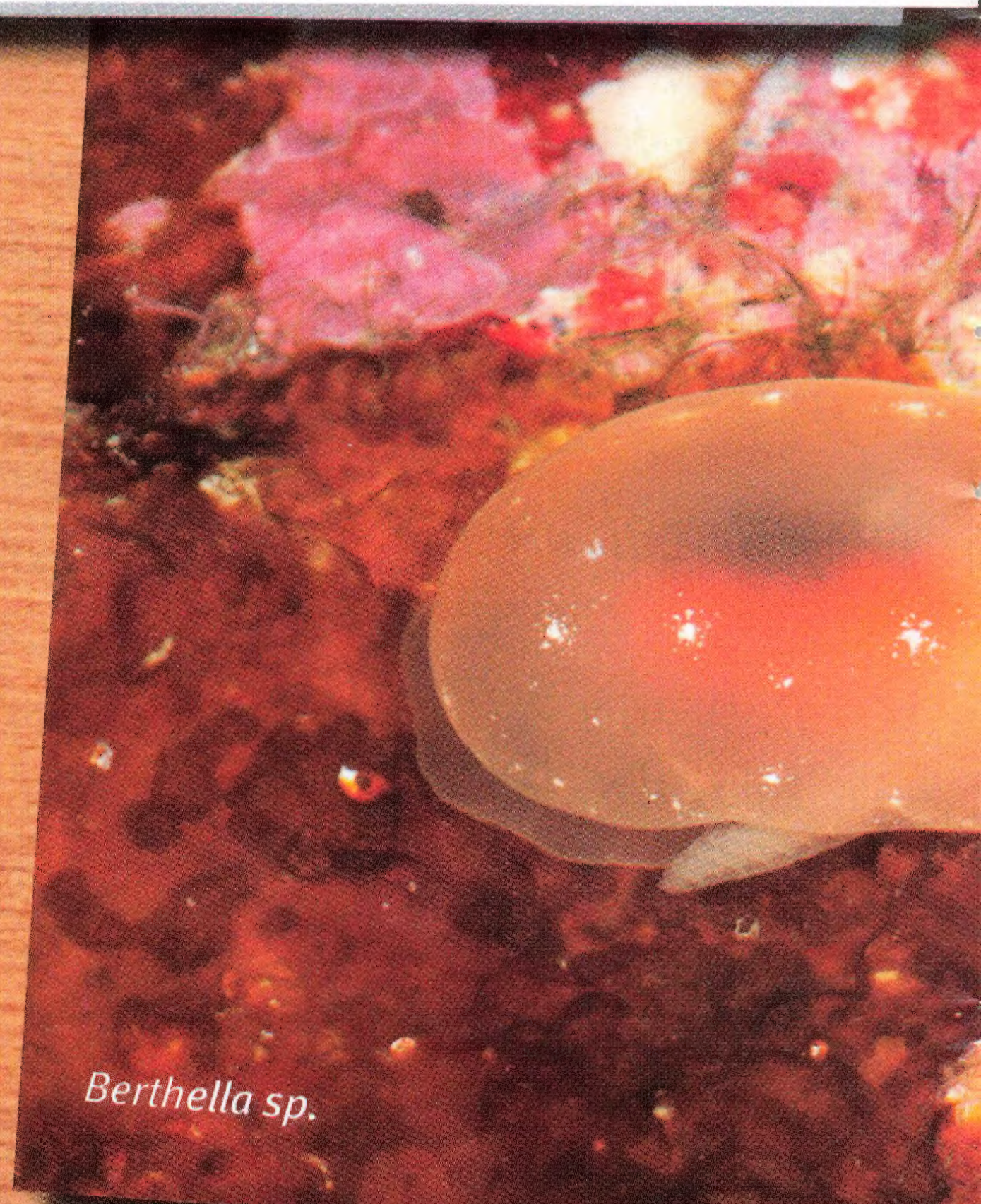
Pulau Tenggol

Today is representative of a typical day in the field: wake up at 6:30, in the water by 8:00, two dives before lunch, two dives in the afternoon, and sorting through copious notes and photographs in the evening. During my dives, I look for nudibranchs crawling on corals, sponges, rocks, and other surfaces, and the first thing I do when I spot one is to photograph it in its natural habitat. Nudibranchs are wonderfully photogenic. Iridescent spots, sparkling tentacles, translucent skin, multiple shades of orange, blue, purple, yellow, red, pink, black—in my 40 years of studying nudibranchs, their variety of external color patterns never ceases to amaze me.

If I want to collect a nudibranch for closer study, I use my finger to flick the little guy off the reef and into a plastic bag. Back on the ship, I will put it in a shallow container and photograph it under controlled conditions, then return it to the reef on a later dive.

October 4, 2007 Back at Pulau Tioman

Tonight I have quite a scare. While doing a night dive on the reef slope, my dive light floods and malfunctions. I do not relish the thought of swimming in the dark, but luckily, I find a few colleagues nearby. One of them, Jerry, hands me his backup light and I am back in business. I still manage to take some photos and even find a couple of nudibranchs.

*Berthella* sp.

The reef at night is a very different world. Fish, crustaceans, nudibranchs, and even coral polyps that were active during the day retreat into holes and crevices, while their nocturnal counterparts emerge to roam the territory. It's like a changing of the guard, and it adds another layer of complexity to the already elaborate coral reef ecosystem.

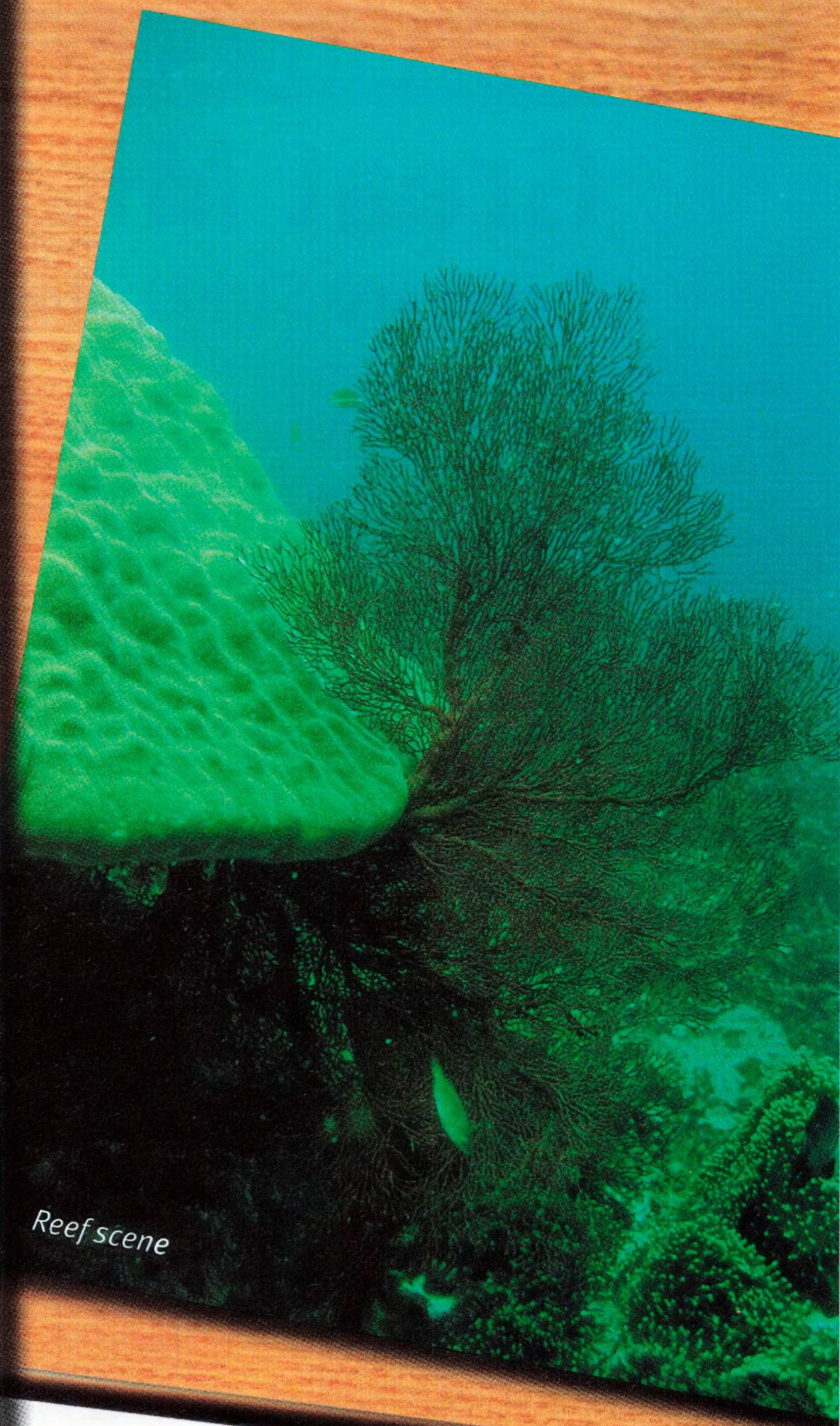
October 6, 2007 - East of Kuantan

On the last day of the expedition, we get a real treat: exploring an oil tanker that sank 40 years ago. Marine life has colonized every nook and cranny of the wreck, taking advantage of the only hard substrate in an area of mostly barren sand flats. It hosts a variety of corals, sponges, barnacles, nudibranchs, urchins, and fish—many of which I haven't seen at our other dive sites. The shipwreck acts like an underwater island, allowing its inhabitants to thrive in a relatively isolated environment.

Exploring a shipwreck



Reef scene



Over the course of 11 days, we have covered 180 miles, made 34 separate dives, and discovered seven new species of nudibranchs. I am pleased with the work we accomplished. With the data collected on this trip, data from past trips to Papua New Guinea, Madagascar, and Palmyra Atoll, and additional photographs from our many collaborators, I estimate that our field guide is now 85-90% complete. This labor of love has taken 10 years so far! When finished, it will feature photos and detailed descriptions of over 1,500 different species. Our hope is that it will become a valuable resource for recreational divers, conservation biologists, and nudibranch specialists like myself. But I'm getting ahead of myself—we still have plenty of work to do and places to explore. Next up in March 2008: the Philippines!

PROGRAMMING & HIGHLIGHTS, DECEMBER - JANUARY 6

Great Migration Begins

Howard Street Closing Festivities—January 6

After nearly a decade of planning, the new Academy building in Golden Gate Park is now a reality. The recycled steel columns have been painted, the wildflowers on the roof have been planted, and the building is ready to receive the exhibits and aquarium displays that will bring it to life. On January 7, the Academy will embark on the most massive move ever undertaken by a museum, as it transports thousands of live animals and millions of research specimens into their new home.



It will be a migration unlike any other. Penguins will be loaded into dog kennels lined with recycled newspaper pellets, a 58 year-old alligator gar will be lifted by stretcher into a transport tank, snakes will be slipped into soft canvas bags, and 1,500 colonies of living coral will be individually packed in plastic bags full of carefully regulated water. Thousands of Galapagos finches (the group studied by Darwin) and over 10,000 sets of bird nests and eggs will be stabilized with bubble wrap, millions of pressed and dried plant specimens will be tied into

secure bundles, and a 1,350-pound quartz cluster will be hoisted into a moving van. Among the most delicate participants in the migration, more than 700,000 pinned butterflies and moths will be handled with extra care to prevent their wings from being jostled.

In order to ensure that this Great Migration goes as quickly and smoothly as possible, the Academy will be closing its doors at 875 Howard Street at the end of the day on January 6, 2008. To celebrate the past three and a half years at Howard Street and kick off the countdown to opening day in Golden Gate Park, the museum will host a day of special programs and festivities on Sunday, January 6. Through a series of talks and slideshows, Academy scientists will reveal what it takes to move everything from a feisty South American arapaima to fragile feather leis from the



Anthropology collections. They will also share the Academy's plans for the new exhibits and aquarium displays in Golden Gate Park. Meanwhile, an arts and crafts station will allow kids to decorate moving labels for the Academy's specimen boxes and make murals for the animal transport trucks. Closing ceremonies will take place at the end of the day. For more details and a schedule of events, please see www.calacademy.org.



While the museum will not be open to the public between January 7 and opening day in the Fall of 2008, the Academy will continue to offer lectures and other programs for its members throughout the migration back to Golden Gate Park. Additionally, members will be invited to preview the new museum before the official public opening. It's sure to be worth the wait.

Story Time

Every Saturday

Last day this program will be featured is Saturday, January 5.

10:30 am

Explore nature with a story for children ages 3-5. Story time takes place in the Nature Nest on the 2nd floor.



Penguin Feeding

Every Day

Last day this program will be featured is Sunday January 6.

11:00 am & 3:30 pm

Watch the Academy's African penguins dip and dive in their tank and maintain their shelters. Visitors can enjoy feeding shows and ask questions as an aquatic biologist dons a wet suit, takes temperature measurements, and then tosses vitamin-stuffed herring and capelin to the penguins. Each feeding takes 20 minutes.



PROGRAMMING & HIGHLIGHTS

Stargazing at the SF Botanical Gardens

Friday, February 29
6:30 pm-8 pm (sunset at 6:02 pm)

In case of cloudy skies, observation session will be cancelled, but a slide lecture will be available in the County Fair Building.



On a night that occurs only once every four years (Happy Leap Day!), the bright constellations of Winter—Orion the Hunter, Taurus the Bull, Gemini the Twins, and others—take center stage in the night sky, surrounding the red planet Mars. Meanwhile, the beautiful ringed planet Saturn rises in the east against the stars of Leo the Lion, previewing the Springtime sky. A laser-guided tour of the constellations is followed by a telescopic search for deep-sky treasures, including a place where stars are born, young clusters of sun-like stars, the brightest star in the night sky possessing a planet, and a giant galaxy much like our own Milky Way! Wear warm clothing to ward off the winter chill and - if you have them - bring binoculars and a red flashlight to preserve night-vision.

BioForum 2008: Symposium for Science Educators



Global Climate Change and Its Influence On Evolution



Saturday, February 9
8:30am - 4pm
University of California
Museum of Paleontology, 2050
Valley Life Sciences Building,
UC Berkeley

Members \$25,
Non-members \$30, Students \$15

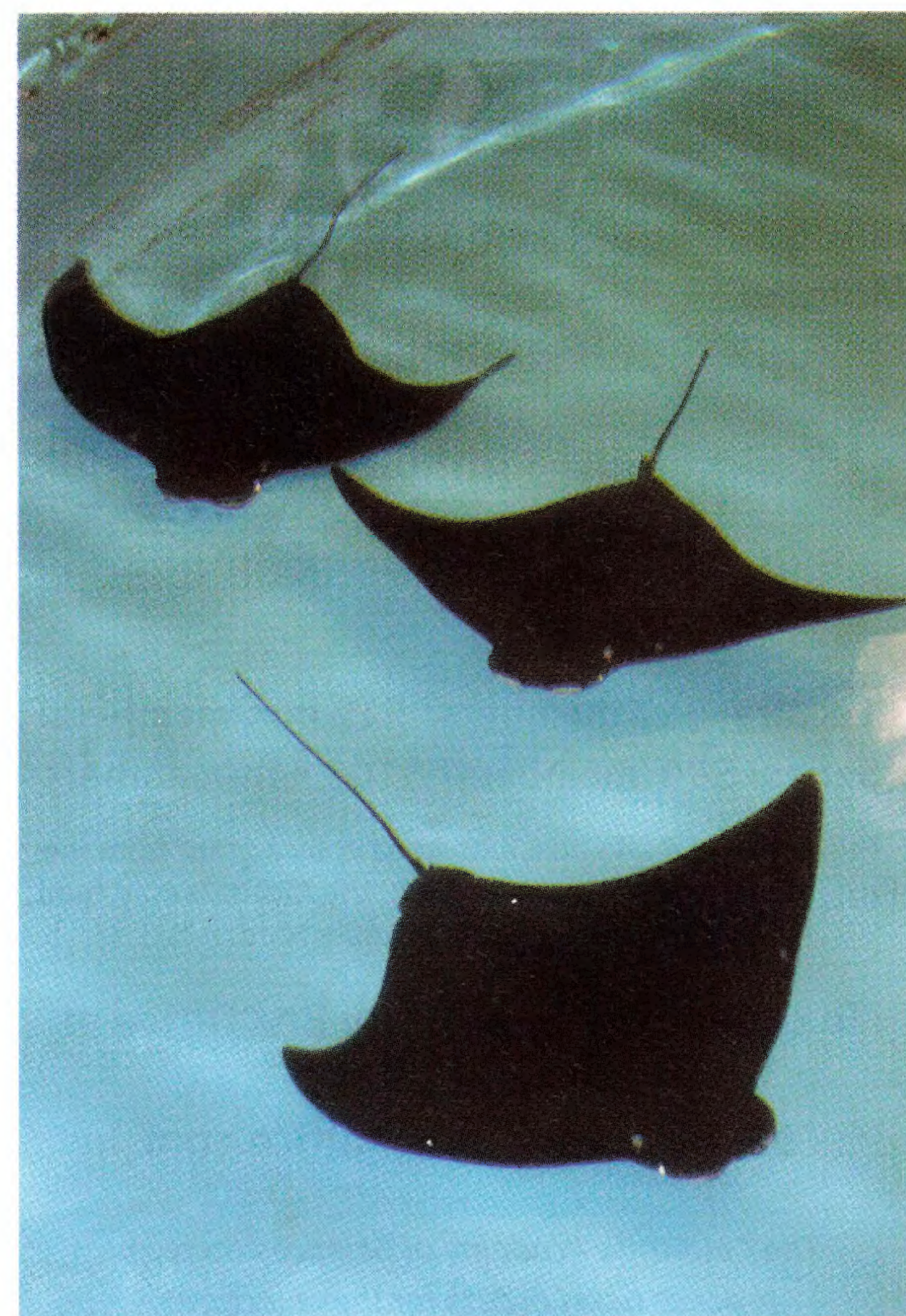
There are growing concerns that the planet is experiencing global climate change at a level that will have major consequences. Both global warming and global cooling have occurred in the past, so how is this different? Meet and chat with experts to learn about past global changes and how they have influenced evolution, including that of humans, and what the implications might be for the future. This BioForum is jointly sponsored and produced by the University of California Museum of Paleontology and California Academy of Sciences.

To register call (415) 321-8000 or go to www.calacademy.org/education/bioforum to register online.

New Rays Arrive at Howard Street



On October 25, the Academy received a shipment of new honeycomb rays, bluespot rays, and cownose rays that will soon make their home in the Philippine Coral Reef tank in Golden Gate Park. These graceful animals are all native to the Pacific Ocean, in keeping with the tank's Philippine theme. In order to promote sustainable sourcing programs, Steinhart Aquarium biologists will be studying the reproductive biology of the new arrivals, pioneering a controlled captive breeding program for the species. In time, they hope to work collectively with other institutions, including the Georgia Aquarium in Atlanta, to trade surplus offspring and share information.



Conversations at the Herbst Theatre 2008

Presented by City Arts & Lectures, Inc.
All Programs at Herbst Theatre, 8 pm

- | | |
|------------------------|--|
| January 3
Thursday | Michael Pollan
Science writer
<i>In Defense of Food</i>
<i>The Omnivore's Dilemma</i>
In conversation with
Patricia Unterman

<i>The Annual Claire Matzger</i>
<i>Lilienthal Distinguished Lecturer</i> |
| February 19
Tuesday | Neil DeGrasse Tyson
Director, Hayden Planetarium
<i>Death by Black Hole</i> |
| March 6
Thursday | Amory Lovins
Co-founder,
Rocky Mountain Institute
<i>Natural Capitalism</i>
<i>Winning the Oil Endgame</i>
<i>Factor Four</i>
In conversation with
Roy Eisenhardt |
| March 26
Monday | Bill McKibben
Nature writer,
Environmentalist
<i>Deep Economy</i>
<i>The End of Nature</i> |
| April 28
Monday | Vandana Shiva
Director, Research
Foundation on Science,
Technology, and Ecology
<i>Water Wars • Biopiracy</i>
<i>Staying Alive</i>
In conversation with
Carol Tang |
| June 9
Monday | Thomas Lovejoy
Conservation biologist
President, Heinz Center for
Science, Economics, and
the Environment
In conversation with
Kevin Welch |

Lecture: \$17 members/ \$19 non-members
Series: \$90 members/ \$102 non-members

This series is made possible, in part, by a grant from the
Richard and Rhoda Goldman Fund, the Myers Family Fund,
and the Lillienthal Family Fund.

To order tickets, call City Box Office at
(415) 392-4400
or visit www.cityboxoffice.com.

The California Academy of Sciences does not
process ticket orders for these lectures.

ACADEMY LECTURES

Location: Sequoia Boardroom,
California Academy of Sciences

Tickets: Free for Academy members, \$8 non-members.

Tickets can be purchased by calling (415) 321-8000 or at the door,
when available.

Also available online at:

<https://www.calacademy.org/lectures/tickets/>

Chief Marin: Leader, Rebel, and Legend

Betty Goerke
Professor of
Anthropology,
College of Marin

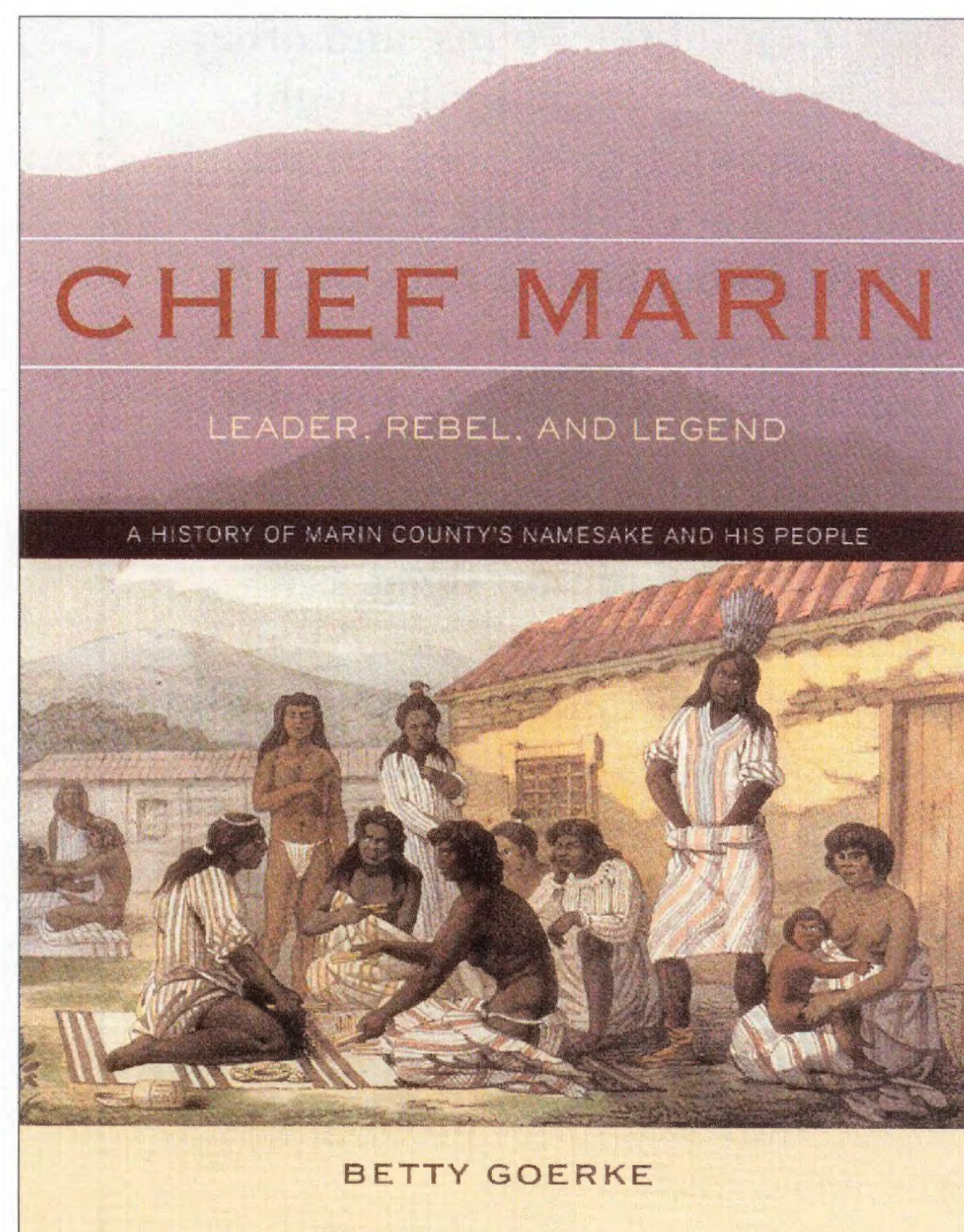
**Tuesday, December 4
2 & 7:30 pm**

Using mission records, ethnographies, explorers' and missionaries' diaries and correspondence, Betty Goerke has pieced together a fascinating portrait of a local Native American leader. Chief Marin led the Native resistance to Spanish colonization as the mission system collapsed and California became transformed by the newly arrived settlers. Goerke, an anthropologist and archaeologist, paints a picture of the California of Marin's time: the sights, smells, and sounds of the land; the traditions the Coast Miwok fought to preserve; and the colonial system against which Marin and other Native American leaders struggled to keep their way of life.

Book signing to follow the lecture.



Photo by: Marvin Collins



BENJAMIN DEAN

LECTURE SERIES IN ASTRONOMY

Location: Jewish Community Center, 3200 California Street, San Francisco

Tickets: \$4, available at www.calacademy.org/lectures/tickets

Series information at www.calacademy.org/planetarium/dean.php

For advance notice of lectures, join the Dean email list by sending an email to deanseries@calacademy.org.



The Orion Nebula: Where Stars Are Born

Dr. Robert O'Dell, Vanderbilt University

7:30 pm Tuesday, December 18, 2007

The famous Orion Nebula is only the most visible part of the process of star formation that occurs in this region. Recent observations with the Hubble Space Telescope and ground-based infrared telescopes have revealed that star formation there has extended to within the last 100,000 years—relatively recent compared with the age of the Universe. This talk will feature Hubble images made by the speaker and a simulated flying tour through the nebula.

Star Dust: The Cosmic Seeds of Life

Dr. Sun Kwok, University of Hong Kong

7:30 pm Monday, January 14, 2008

For the last fifty years, scientists have believed that life on Earth began with simple inorganic molecules that, under proper conditions, gradually evolved into complex organic compounds and eventually life. Recently, through observations with space-based infrared telescopes, astronomers have discovered that old stars can synthesize organic compounds over relatively short time scales. Stellar winds then spread these organic materials throughout the Galaxy, including our primordial solar system.

Visualizing the Infrared Universe of the Spitzer Space Telescope

Dr. Robert Hurt, California Institute of Technology

7:30 pm Monday, February 25, 2008

The Spitzer Space Telescope is the largest infrared telescope ever launched into space. Its highly sensitive instruments give us a unique view of the Universe and allow us to peer into regions of space which are hidden from optical telescopes. Many areas of space are filled with vast, dense clouds of gas and dust which block our view. Infrared light, however, can penetrate these clouds, allowing us to peer into regions of star formation, the centers of galaxies, and into newly forming planetary systems. Infrared also brings us information about the cooler objects in space, such as smaller stars which are too dim to be detected by their visible light, extrasolar planets, and giant molecular clouds. Join Dr. Robert Hurt to learn how this new data can be translated into astronomical imagery, illustrations, and animations.

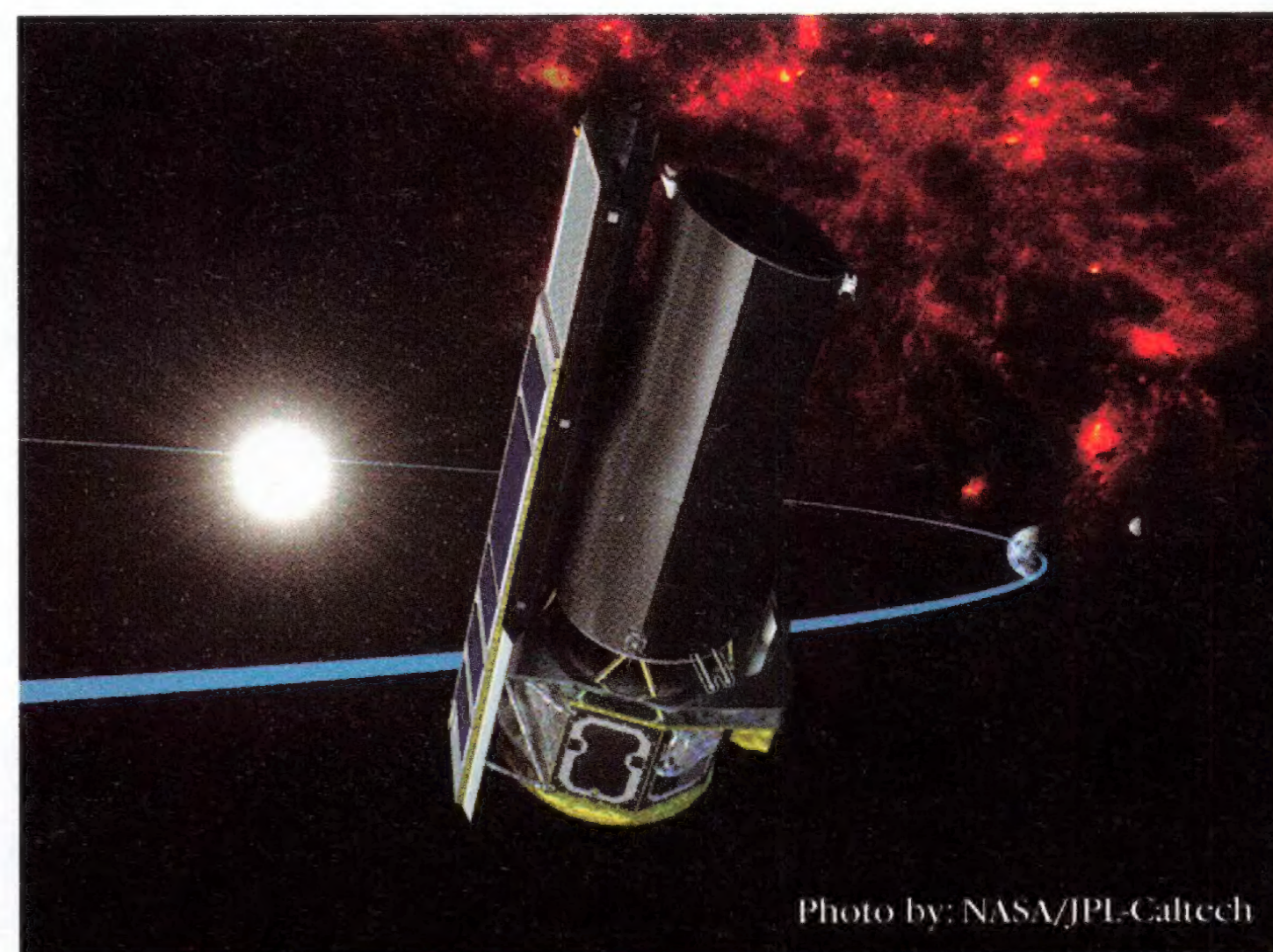


Photo by: NASA/JPL-Caltech

Artist's rendition of Spitzer in its heliocentric orbit

Sunday

Monday

Tuesday

Wedn

DECEMBER

<div>2</div> <div>Penguin Feeding Penguin Feeding</div> <div>11:00am 3:30pm</div> <div></div>	<div>3</div> <div>Penguin Feeding Penguin Feeding</div> <div>11:00am 3:30pm</div> <div></div>	<div>4</div> <div>Penguin Feeding Lecture Penguin Feeding Lecture</div> <div>11:00am 2:00pm 3:30pm 7:30pm</div> <div></div>	<div>5</div> <div>Penguin Feeding Penguin Feeding</div> <div>11:00am 3:30pm</div> <div></div>
<div>PENGUIN FEEDING Every Day 11am & 3:30pm</div> <div></div>		<div>11</div> <div>Penguin Feeding Penguin Feeding</div> <div>11:00am 3:30pm</div> <div></div>	<div>12</div> <div>Penguin Feeding Penguin Feeding</div> <div>11:00am 3:30pm</div> <div></div>
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		<div>JANUARY</div>	

Closing Festivities!

On January 6, celebrate the Academy's last day at Howard Street with:

- arts and crafts
- talks and slideshows
- Q&A with scientists

See page 6 for details.



esday

Thursday

Friday

Saturday

Please see Programs & Highlights on pages 6-7, and Lectures on pages 8-9 for a full description of calendar items. For more information, check our website: www.calacademy.org.



1

Story Time

10:30am

Penguin Feeding

11:00am

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Penguin Feeding

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Penguin Feeding

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Story Time

10:30am

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Penguin Feeding

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Story Time

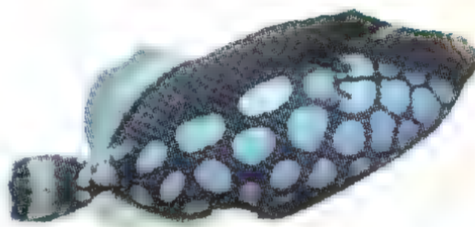
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Penguin Feeding

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Penguin Feeding

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3rd Thursday

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Penguin Feeding

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Story Time

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Penguin Feeding

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Story Time

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Penguin Feeding

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Penguin Feeding

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Story Time

10:30am

Penguin Feeding

11:00am

Penguin Feeding

3:30pm

JANUARY

JANUARY

JANUARY

JANUARY



December 9 ●

Time once again to celebrate the beginning of Spring...on Mars.
Back on Earth, **New Moon** occurs at 9:40 am PST, when the Moon and the Sun both lie in the same direction. The Moon is completely dark and not visible at this time, but the sighting of the first visible crescent at dusk tomorrow night (the 10th), officially marks the start of the month of Dhul-Hijjah in the Islamic calendar.

December 14 ★

Peak of the Geminid **meteor shower**, favored by a waxing crescent Moon that sets well before midnight. First observed in 1862 and now recognized as the most reliable meteor shower, this display averages about 60 meteors per hour, but isn't as well known as the warm-weather Perseid shower of August.

December 21

Winter solstice, or the start of Winter in the Northern Hemisphere, at 10:10 pm PST. Some calendars adjust for time zones east of the Rocky Mountains, and thus list the date as December 22nd. In the Southern Hemisphere, this is the start of Summer.

December 23 ○

Full Moon at 5:15 pm PST, also known at the "Baby Bear Moon" to the Osage, the "Little Spirit Moon" to the Ojibway, and the "Ground Hog Mother's Moon" to the Tlingit. As with the solstice (see above), some calendars may list this on the 24th because adjusting from Pacific to Greenwich Time adds 8 hours, crossing midnight and changing the date. Look for Mars near the Moon tonight (see "Planets" section below).

January 2

Earth at perihelion, or closest to the Sun. In school, we learn that Earth's average distance from the Sun is 93 million miles, but today, it's about 91.4 million miles. Occurring in Winter, this shows that the seasons are due not to Earth's distance from our star, but rather to the tilt of Earth's axis with respect to the Sun.

January 3 ★

Peak of the Quadrantid **meteor shower**, a winter display that deserves more recognition and usually averages about 40 meteors per hour. A waning crescent Moon only 4 days old shouldn't offer too much interfering light, so this should be a reasonably good display between midnight and dawn.

January 8 ●

New Moon at 3:38 am PST. The month Muharram in the Islamic calendar begins with the sighting of the first crescent after this new Moon, but that won't occur until tomorrow evening (sunset of the 9th).

January 22 ○

Full Moon at 5:35 am PST. Known as the "Moon of the Terrible" to the Dakotah Sioux, the "Cold Meal Moon" to the Natchez, and the "Goose Moon" to the Tlingit. Watch how high mid-Winter's full Moon crosses the sky – the opposite of how low the mid-Winter Sun does.

February 6 ●


New Moon at 7:45 pm PST. Sighting of tomorrow night's first thin crescent just after sunset will mark the start of the month Safar in the Islamic calendar. In a few days, look for Earthshine dimly illuminating the Moon's dark face. Also, the new Moon moves between the Earth and the Sun, causing an annular solar eclipse that is visible only from some parts of Antarctica. The partial phases are visible from New Zealand and parts of eastern Australia. None of the eclipse is visible from anywhere in the U.S.

February 20 ○

Full Moon at 7:31 pm PST, also known as the "Little Famine Moon" to the Choctaw, the "Sucker Moon" to the Ojibway, and the "Moon When the Ducks Come Back to Hide" to the Ponca. A total lunar eclipse is seen from most of North & South America as the full Moon moves through Earth's red shadow. First contact with the core of the shadow is at 5:43 pm PST...just minutes before moonrise for West coast observers. Totality is at 7:01 pm PST, lasting until 7:51 pm PST, and last contact is at 9:09 pm PST.

	SUNRISE	LOCAL NOON	SUNSET
DECEMBER 1	7:06 AM PST	11:59 AM PST	4:51 PM PST
JANUARY 1	7:25 AM PST	12:13 PM PST	5:01 PM PST
FEBRUARY 1	7:14 AM PST	12:23 PM PST	5:33 PM PST

(Times are for San Francisco, CA, and will vary slightly for other locations.)



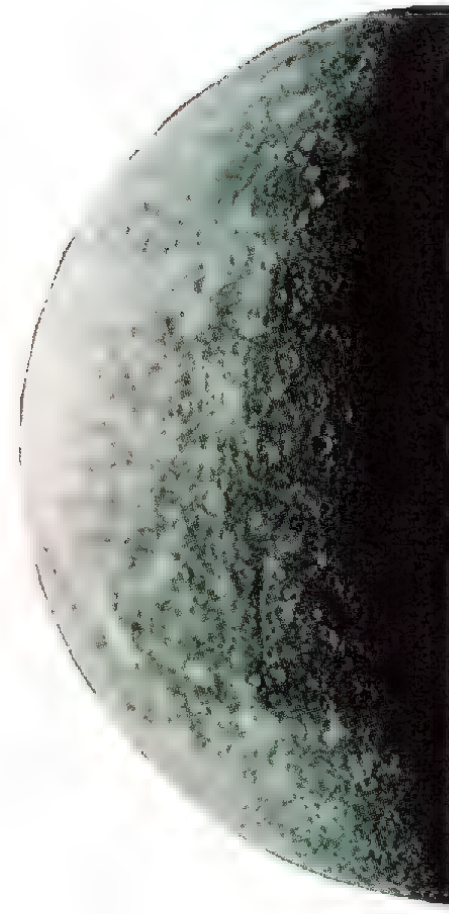
ASTEROID OR EXTINCT COMET?

On December 10th, the 5 kilometer wide asteroid known as Phaethon passes less than 12 million miles from Earth – its closest approach since it was discovered in 1983. Shortly after it was spotted by the Infra-Red Astronomical Satellite (IRAS), its orbit was found to be identical to that of the Geminid meteors, leading astronomers to speculate that Phaethon could be an extinct comet rather than an ordinary asteroid. The suggestion would make sense, if true. Since Phaethon's orbital period is very short (only 1.4 years) and since its closest approach to the Sun is closer than that of Mercury, it has likely made so many passes near the Sun that its supply of icy material has completely burned off, leaving only a rocky asteroid core. Further study has shown no cometary activity, and successive passes of this object have not replenished the Geminid dust stream the way other comet returns have replenished showers such as the Leonids and others. Although the association between object Phaethon and the Geminid shower is clear, the precise relationship between the two is not, and during the upcoming encounter, Phaethon will be studied by various methods from Earthbound observatories in the hope of understanding the true nature of this mysterious vagabond from the depths of our solar system.

The Planets

Mercury

Mercury is lost in the glow of the rising Sun in December, passing behind our star and reappearing in the evening sky in mid-January – but look fast, because true to its reputation as a speedy and elusive target, Mercury isn't visible for long. Mercury retreats once more into the Sun's glow in early February, reappearing in the morning sky by mid-month. The Moon is nearby and might make finding Mercury a little easier on January 9th – the December and February encounters are too close to the Sun to be seen.



Venus



Venus is prominent in the predawn sky all season, rising slightly later each morning and passing from the stars of Virgo into those of Libra, Scorpius, Ophiuchus, and finally, Sagittarius. The waning crescent Moon passes nearby on the mornings of December 5th (forming a triangle with the star Spica), January 4th & 5th, (forming a tight triangle with the star Antares), and February 4th (forming another triangle, this time with the planet Jupiter). On the morning of February 1st, Venus and Jupiter rise less than a degree apart about 90 minutes before dawn.



Mars

At opposition on December 24th, Mars rises at sunset and is visible all night long, slowly rising slightly earlier each night. During the season, Mars is moving in retrograde, or "backward" with respect to its usual direction of motion against the stars, and moves from Gemini into Taurus then heads back into Gemini in February. The Moon is located nearby on the evenings of December 23rd, January 19th, and February 15th (use these opportunities to compare their speeds as they cross the sky – which object is faster?).

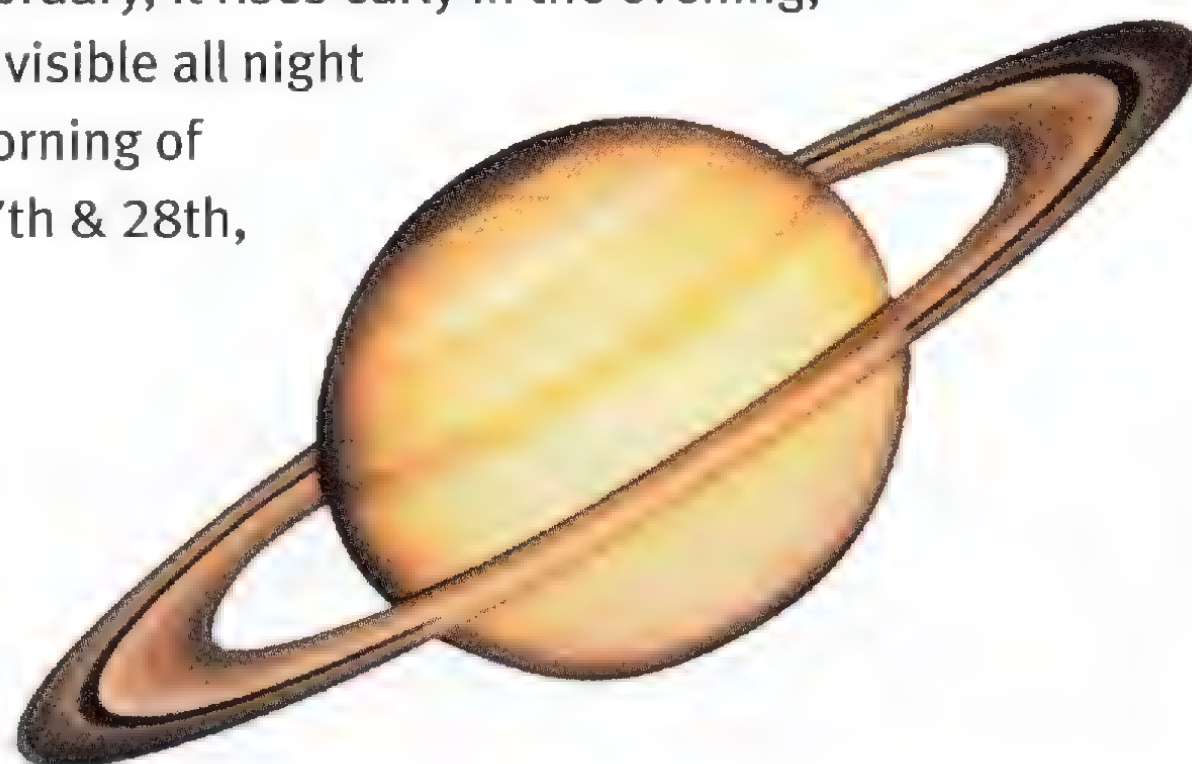
Jupiter

By December 1st, Jupiter is barely visible, low in the southwest just after sunset, and it disappears by mid-month into the Sun's glow. It reappears in the morning sky in mid-January, rising in the southeast against the stars of Sagittarius. The crescent Moon's pass near Jupiter may be too close to the Sun to be seen on the evening of December 10th, but when Jupiter moves into the morning sky, it might be easier to see the Moon nearby just before dawn on January 6th. The giant planet makes a very close pass near brilliant Venus on the morning of February 1st, and forms a tight triangle with Venus and the waning crescent Moon before sunrise on February 4th.



Saturn

Loitering against the stars of Leo, the Ringed Planet is best observed during the predawn hours in December, rising in the east around midnight early in the month. Then, by early January, it rises by 10 pm and becomes a late-night sight. By February, it rises early in the evening, reaching opposition on February 24th, when it's visible all night long...still in Leo. The Moon swings by on the morning of December 1st, and the evenings of December 27th & 28th, January 24th, and February 20th.



WOULD YOU LIKE TO STAR IN THE NEW ACADEMY?

The new Academy building in Golden Gate Park opens in just under a year.

On opening day—and for a long time after that—the Academy wants to staff the main floor with enthusiastic and knowledgeable Academy Guides to facilitate the visitor experience. Academy Guides will staff specimen carts, create comets and volcanoes, conduct focus talks, and work with invertebrates in the Discovery Tide pool, as well as with reptiles. The choice is yours.

Training begins in February 2008. Candidates will learn about the Rainforest, Africa, California and Climate Change, the Coral Reef, and Earth and Space. Training will be dynamic and hands-on.

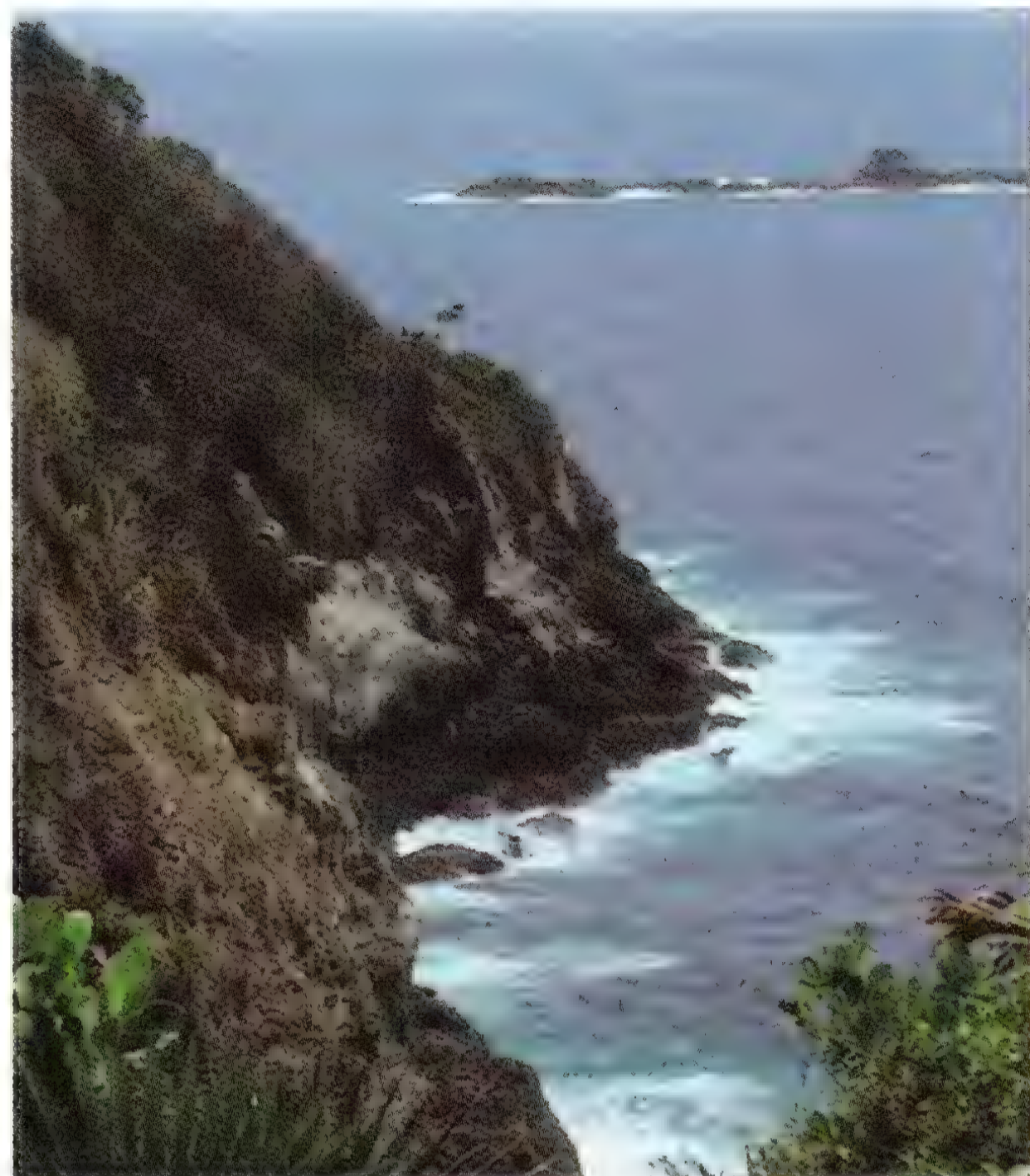
Become an Academy Guide and encourage your friends and relatives to participate in this once-in-a-lifetime experience.

Be a part of a new era in the history of the Academy. We welcome your participation.

Call Rosalind Henning at (415) 321-8111 or email her at rhenning@calacademy.org for information about becoming an Academy Guide or for other volunteer opportunities.

ACADEMY TRAVEL PROGRAM

The mission of the Travel Program is to offer Academy-led tours that place members in the context of specifically chosen natural environments. Teaching, understanding, and conservation are our goals.



TRINIDAD AND TOBAGO

April 20 – 29, 2008

Leaders: Peter Roopnarine and Carol Tang

Attractive to nature lovers for an astonishing array of landscapes, from low mountains and mangrove swamps to dense forests and lovely beaches, the Caribbean islands of Trinidad and Tobago are tropical paradises and ideal wildlife habitats. Discover a wealth of exotic flora and fauna during nature viewing excursions, and learn about local culture from Peter Roopnarine, who grew up on the islands. Stay at the Asa Wright Nature Center, known for its conservation and education efforts, delicious cuisine and a beautiful setting in a valley surrounded by swamps, marshes, rainforests and savannas. Tobago offers an interesting contrast to Trinidad, with vegetation ranging from Norfolk pine to bamboo forests.

Cost: \$4,695/person, based on double occupancy, plus airfare

ALASKA'S HIGH ARCTIC

June 5 – June 15, 2008

Leaders: Dave and Bev Kavanaugh

The delicate balancing act between energy exploration and environmental conservation in Alaska's remote High Arctic region has been a hot-button political issue for decades. In the context of the debate over global climate change, this fascinating program offers an unique opportunity to learn firsthand about pressing issues in this ecologically fragile environment, among them the impact of rising temperatures on traditional ways of life and the area's wildlife. Visit research stations and petroleum production facilities, meet with conservationists and field scientists, and explore the Arctic National Wildlife Refuge and Bristol Bay. Marvel at the grandeur of Alaska during flights over the Brooks Range and vast tundra, and gain valuable perspectives on the human and cultural aspects of this debate while staying in local communities like Barrow, the northernmost town in America.



Cost: \$9,445/person, based on double occupancy, plus airfare

For brochures or additional information, please contact the Academy Travel Office.

Phone 415.901.8129 or 800.853.9372 E-mail: calacademy@hcaptravel.com

Travel web page: www.calacademy.org/geninfo/travel

Race for Survival

Slowly and steadily, small-scale fisheries may eradicate loggerhead turtles from the face of the Earth

Dr. Wallace J. Nichols with a sea turtle.

Photo by: Neil Osborne

After hatching in Japan, the juvenile loggerhead turtle embarks on a course laid down by its ancestors millions of years ago: swimming 7,000 miles across the Pacific Ocean toward Mexico to feed on swarms of delicious pelagic red crabs. During the first six years of its journey, it survives typhoons, occasional exhaustion, and hungry sharks, but it is no match for what it finds off the coast of Mexico: the gillnet.

Used throughout the world by coastal fishermen, gillnets catch fish by snagging the animals' gill covers as they try to swim through the mesh. The nets are set like curtains in the water, either suspended from the surface or weighted to the bottom, and they range from a few dozen to thousands of feet long.

Although this gillnet is meant for California halibut, it is just as effective

at capturing the juvenile turtle. The barnacles and horny plates on the turtle's shell get caught on the mesh first, and then as it tries to turn, its flippers are snagged as well. In a panic, it flails its body but only becomes more tangled. Under normal circumstances, it is capable of diving up to 20 minutes without surfacing, but its body is now greatly stressed and badly in need of oxygen. Since this gillnet is anchored



Photo by WJ Nichols

Loggerheads migrate across the Pacific Ocean and feed on millions of these pelagic red crabs.

to the seabed, the turtle cannot pull upward toward the surface. It drowns within minutes. The last thing it sees is the silhouette of a boat on the surface.

"Another one," the fisherman says in Spanish, as he pulls the net out of the water. Dr. Wallace J. Nichols, an Academy research associate, and his team have spent years with this fishing fleet and found thousands of loggerheads drowned in the same way. They also monitor a fleet that uses bottom-set longlines—long fishing lines with shorter lines tethered to them, all studded with hundreds of baited hooks. In the course of one seven-day period, they counted 24 turtles accidentally hooked and drowned on these longlines.

How did Nichols end up following these Mexican fishermen, and what was he hoping to learn? The journey began more than a decade ago.



Photo by: Terri Garland



Photo by: NOAA

Left: Victim of a gillnet. Nichols has seen thousands of cases like this over the years. Above: Turtle flipper cut by fishing net. Opposite page top left and top right: Victims of longline fishing hooks. If the longline is anchored to the seabed, the turtle will usually drown.

“As a graduate student working in Baja California,” Nichols says, “I noticed a lot of dead turtles on the beach. I talked to the local fishermen, who said they often found dead turtles caught in their nets or on their hooks. If the turtles were too decomposed to eat, they would throw them back in the water.” These discarded carcasses were what Nichols saw washing ashore. He and fellow turtle biologist Hoyt Peckham, a UC Santa Cruz graduate student, began to wonder: Just how much of an impact do these local, small-scale fisheries have on the turtle population?

Though accidental catch (or “bycatch”) in large, industrial-scale fisheries was well-documented, scientists had never rigorously examined the bycatch in small-scale fisheries. So from June to July 2005, Peckham, Nichols and other colleagues shadowed a gillnet fishing fleet from the town of Puerto López Mateos. In September 2005, they shadowed a longline fishing fleet from Santa Rosa. On each outing, they counted the number of dead turtles among the bycatch. They chose these fleets because their fishing ranges overlapped with an area of high loggerhead occurrence, which Nichols and Peckham knew from years of tagging and tracking turtles with satellite transmitters.

Their findings were shocking. By taking the data they collected and performing a conservative extrapolation, they estimated that in the year 2005, the gillnet fleet alone would kill *at least* 299 turtles, and the longline fleet would kill *at least* 680 turtles. These two small-scale fleets killed approximately 1,000 turtles a year—the same order of magnitude as an industrial-scale fleet ranging across the entire Pacific. And there were at least 10 other fleets like them operating in the same area.*



Photo by: Neil Osborne

Turtle skull on the beach in Baja California.

When considered globally, these findings become even more alarming. Small-scale fisheries represent over 99% of the world’s 51 million fishers. Collectively,

they may pose a much greater threat to endangered species than the industrial giants. And the North Pacific loggerhead off Baja is just one of many instances of an endangered species overlapping with small fishery territories. Seabirds, marine mammals, and other turtle species are in similar danger around the world.

Despite these grim prospects, however, Nichols’ case study does have a silver lining. As a result of the study and a local bycatch awareness campaign—involving murals, comic books, parades, and festivals—the fishermen of Puerto López Mateos established a “Fishers’ Turtle Reserve” in 2006. In an inversion of the normal eco-legislation process, they also asked the federal government to officially sanction the reserve.

“The fishermen have several incentives to change their habits,” says Nichols. “First is their sense of right and wrong. They don’t want to be the bad guys destroying endangered species. There’s also an economic incentive: less bycatch on your gear means more room for fish. And studies we conducted with the fishermen showed that they don’t have to go to the area of high loggerhead occurrence to catch plenty of fish. They can stay closer to shore and save time and money for gas.”

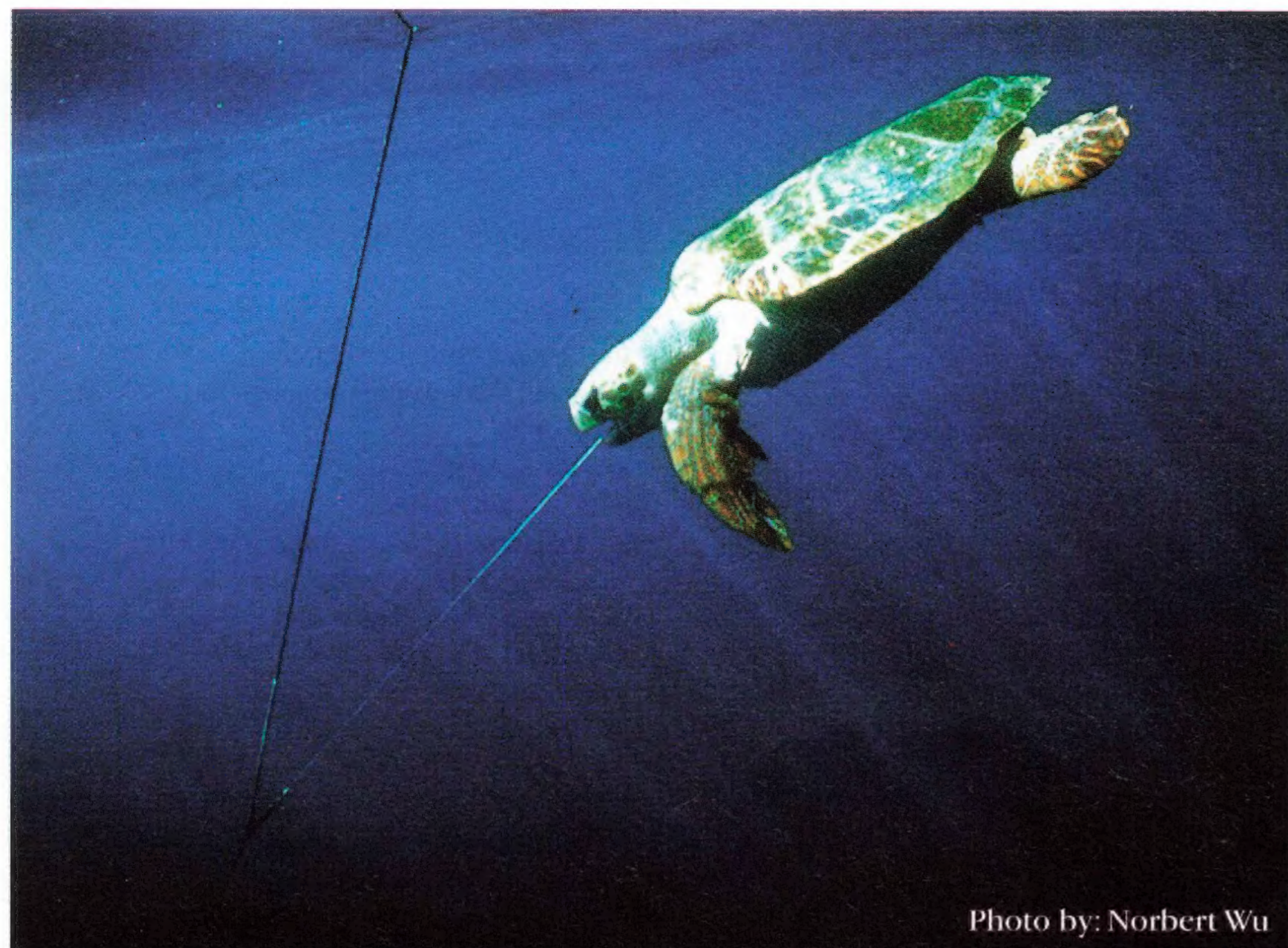


Photo by: Norbert Wu



Photo by: Grupo Tortuguero

Keeping sea turtles around provides another benefit: the opportunity for eco-tourism. Baja California already hosts a thriving whale-watching industry from January to March every year. Turtle-watching from June to August could prove just as successful. The fishermen have already formed a cooperative enterprise to develop a turtle-watching industry and receive training in best practices.

“Your vacation could save a species,” Nichols says. “If a fisherman takes even one day to entertain tourists instead of fishing, think how many turtle lives he could save. And it benefits the tourists as well. Interacting with wild animals is an eye-opening experience, especially for young people, who are increasingly cut off from nature.”

As the Puerto López Mateos case shows, seeking local cooperation and instilling a sense of stewardship among stakeholders can be very effective catalysts for change. With the majority of small-scale fisheries found in developing nations, where top-down management and enforcement are difficult, this grassroots approach—combined with support for conservation tourism—may become the best practical solution for saving species from extinction.

** These findings were published in: Peckham SH, Maldonado Diaz D, Walli A, Ruiz G, Crowder LB, Nichols WJ (2007) Small-Scale Fisheries Bycatch Jeopardizes Endangered Pacific Loggerhead Turtles. PLoS ONE 2(10): e1041. doi:10.1371/journal.pone.0001041*

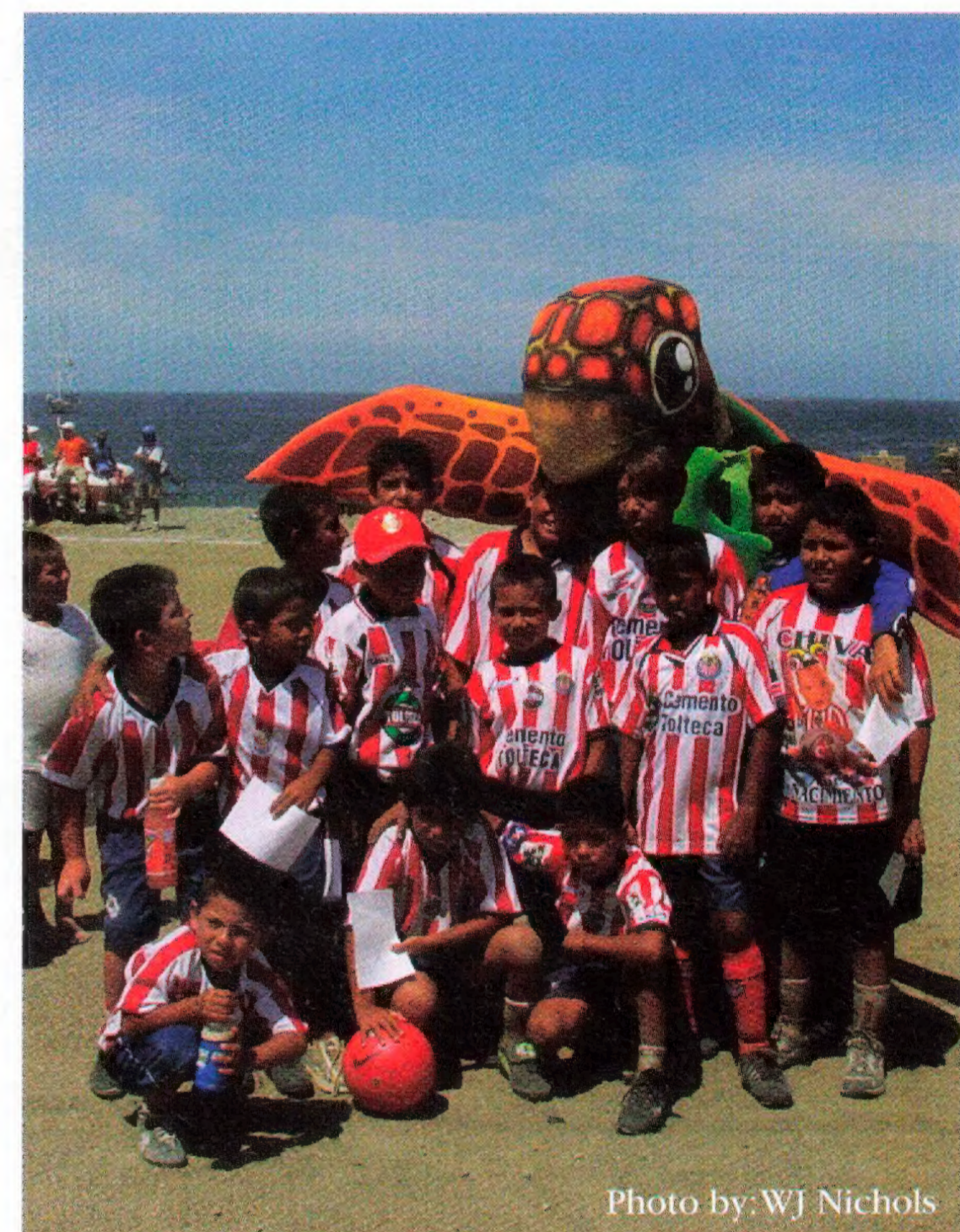


Photo by: WJ Nichols

Nichols' turtle awareness campaign included local sports events.

Three Simple Ways to Do Your Part

1. Get involved in turtle-watching, whether it's at Steinhart Aquarium or with conservation groups in more distant places.
2. Think carefully about the seafood you eat—choose local or sustainable sources. (Download a seafood guide at www.calacademy.org/research/aquatic/seafood_guide.)
3. Keep plastic and garbage out of the ocean, which can choke and kill sea life. Participate in coastal clean-ups.

THANK YOU

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Be among the Academy's highest level donors and community leaders who support our mission to explore, explain, and protect the natural world. Friends of the Academy receive unique benefits such as previews of the new Academy, receptions with scientists, and recognition on the donor wall and in the annual report. In 2008, Friends will also receive exclusive invitations to the opening events for the new Academy.

For information on Friends or to join, please contact Jeanna Yoo at 415.321.8413 or jyoo@calacademy.org. Also, visit us online at www.calacademy.org/friends.

HOWARD STREET CLOSING

Please note that the Academy will close its temporary location at 875 Howard St. on January 6, 2008 to prepare for our move to the new Academy in Golden Gate Park. Keep your membership current and we will welcome you back next fall to exclusive members-only preview parties before the Grand Opening!

ASTC TRAVEL PASSPORT PROGRAM

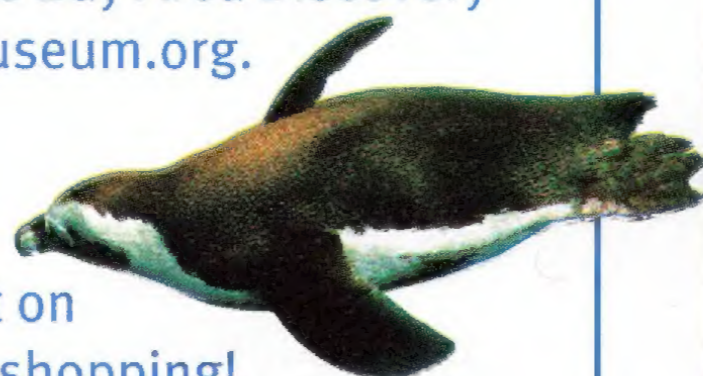
As of October 31, 2007 the Academy will no longer participate in the ASTC Travel Reciprocal Passport Program (reciprocal admission to participating science centers).

50% OFF ADMISSION AT BAY AREA DISCOVERY MUSEUM

Show your Academy membership card during the month of February and get 50% off the admission price at the Bay Area Discovery Museum in Sausalito. For information about the Bay Area Discovery Museum, visit their website at www.baykidsmuseum.org.

DOUBLE DISCOUNT DAYS

Every Sunday during the month of December, Academy members will receive a 20% discount on items purchased at the Academy Store. Happy shopping!



BOO! from the Deep Blue

16th Annual Halloween Costume Party
presented by the Academy Guild

Over 500 children and adults celebrated Halloween at the Academy's 16th Annual Costume Party on Friday, October 26. Families came face-to-face with the Academy's newest arrivals—black-tip reef sharks and green sea turtles—and participated in ocean-inspired activities for children of all ages.



The Academy thanks our generous sponsors
for making this event possible:



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WHY WE ARE EASTWOOD ASSOCIATES



Photo by: Orange Photography

Arthur and Lois Roth enjoy a reception in honor of Academy Friends and Eastwood Associates

Lois and Arthur Roth

Lois has many fond memories of visiting the Academy since she was a child and has always loved the museum's exhibits and educational programs – so much so that she has been a docent for almost 20 years! Lois says, "The friendly, supportive atmosphere makes the Academy an ideal place to learn and teach about the natural world." Lois and Arthur have included the Academy in their estate plans to ensure that the museum continues to educate and delight visitors.

A Few Easy Steps to be an Eastwood Associate:

1. Include the Academy in your estate plans – through a bequest in your will or trust, beneficiary designation of your retirement plan or life insurance, or a life-income gift.
2. Let us know that you are an Eastwood Associate so that we can include you in special events and behind-the-scenes tours.
3. For more information, contact Louise Gregory at 415.321.8407 or lgregory@calacademy.org, or visit the Academy's planned giving website at www.calacademy.org.



On November 1, the Academy officially took possession of its new building in Golden Gate Park. Just over two years after contractors from Webcor Builders broke ground on the site of the Academy's future home, they handed over the keys to a 410,000-square-foot aquarium, museum, and planetarium—a stunning example of sustainable architecture that blends seamlessly into the park.

While the external construction is now complete, the work is far from over. Inside the building, rockwork specialists from Dixon Studios are finishing up the rock platforms that will provide attachment sites for over 1,500 colonies of coral in the new Philippine Coral Reef tank. Similar to concrete, this material

has a high pH, so Steinhart Aquarium biologists are treating the tank with acid to lower the pH and create a fish-friendly environment. In December, the tank will be filled with salt water for the first time, and by the end of the month it will be ready to receive its first corals.

Work is also underway on the four-story Rainforests of the World exhibit. Misting lines are currently being installed to provide the necessary levels of humidity inside the dome, and large planter boxes for five living trees are being filled with soil. The trees for the exhibit are currently being grown in Florida and are now nearly 25 feet tall. In December, they will be shipped to San Francisco in a climate-controlled truck and lifted into the dome, where the temperature will be

kept at a constant 82 degrees Fahrenheit.

Over the next few months, the Swamp will also begin to take shape. A rock island will soon be constructed in the tank, along with an artificial Cypress tree draped with moss. The historic bronze seahorse railing that bordered the original tank has been reinstalled around the perimeter of the new Swamp and will soon bring back fond memories for thousands of visitors. Many of the original hand-painted ceramic tiles have also been reused in the tank walls. In the spring, the tank will receive its new residents: American alligators and alligator snapping turtles. One of the alligators is sure to attract the lion's share of the attention—an albino, its skin is a startling shade of white.

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